



Asheville Regional Airport Master Plan Update

Working Paper #2 –
Forecasts of Aviation Demand
August 2022 DRAFT



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3 FORECASTS OF AVIATION ACTIVITY

This Chapter of the Airport Master Plan Update (Study) presents the comprehensive forecast of aviation activity and demand at Asheville Regional Airport ('AVL' or 'the Airport') over the 20-year planning horizon (2021 – 2041). The forecast consists of projections for all categories of activity at the Airport, including passenger enplanements, air carrier operations and fleet mix, general aviation operations, based aircraft, military operations, and peak activity levels. While the Airport does not currently have cargo activity, it was important to analyze the potential for cargo activity for the purposes of facility sizing.

The forecasts of aviation activity provides the Greater Asheville Regional Airport Authority ('GARAA,' 'Airport Authority,' or 'Authority') with guidance to determine facility sizing and capacity recommendations, both airside and landside, that directly impact future development at the Airport. The forecasts will also facilitate the long-term strategic planning and development plans depicted on the updated Airport Layout Plan (ALP).

The developed forecasts account for the impacts due to COVID-19 ('COVID' or 'the pandemic') and incorporate projected recovery levels based on industry trends and recent activity levels at AVL. The resulting preferred forecast will be submitted to the Federal Aviation Administration (FAA) for approval and acceptance.

It is important to note that the historical and projected activity levels herein represent calendar year data (January through December), while the FAA's Terminal Area Forecast (TAF) is organized according to the FAA fiscal year (October through September).

3.1 FORECAST CATEGORIES

Aviation demand forecasts are prepared for a variety of aviation categories, which are determined based on the type and level of activity expected at an airport over the planning horizon. These categories vary in relevance depending on the size and category of an airport and the basic objectives of a specific master plan.

As previously discussed, this Study evaluated and projected commercial activity (enplanements, operations, and fleet mix), general aviation activity (operations and based aircraft), and military activity. A description of each category is provided below.

- ✈ Commercial Enplanements – A revenue-paying passenger boarding an aircraft at a given airport.
- ✈ Commercial Operations – Operations performed by aircraft designed to have a seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds carrying passengers or cargo for hire or compensation. These operations include scheduled air carriers and regional partners (including all 50-seat regional jet operations), as well as U.S. and foreign flagged carriers.

- ✈ Commercial Fleet Mix – The grouping of aircraft performing commercial operations at the airport. This includes 50-seat regional jets.
- ✈ General Aviation Operations – Includes all segments of the aviation industry except commercial air carriers/regional/commuter service, scheduled cargo, and military operations.
- ✈ General Aviation Based Aircraft – Aircraft that spend more than six months of the year at a given airport and that have an agreement with the airport or a tenant for storage, that can perform takeoffs and landings, and that have a valid (current) FAA airworthiness certificate.
- ✈ Military Operations – Activity performed by the United States military.

3.2 IMPACTS OF COVID-19 ON THE AVIATION INDUSTRY AND AVL

3.2.1 COVID-19 Impacts on Commercial Aviation

In March 2020, COVID-19 (commonly referred to as Coronavirus or ‘COVID’) began impacting the aviation industry and air travel. The impacts of COVID on the aviation system have been split in terms of types of users.

With this, it was important to analyze and become familiar with industry trends, as well as historical activity trends at AVL prior to 2020, to properly evaluate the level of impact COVID-19 has had on the Airport’s activity. These figures also assisted in determining later recovery efforts. Based on these analyses, recent activity trends were compared to both previous activity levels at AVL and the wider aviation industry, which were then integrated into the forecasts accordingly.

Industry Impacts

Commercial activity levels (especially passenger levels) in the United States were impacted more heavily than other users, such as cargo and general aviation (GA). The Transportation Security Administration (TSA) has been tracking national passenger throughput activity for 2019 through 2022 and comparing the activity levels side-by-side¹, as seen below in **Table 3-1**. Further analysis of this data for 2019 and 2020 indicated an approximate 61.9 percent decrease in national throughput passengers; however, activity trends in 2021 were positive and have continued to remain positive in 2022. Month-over-month data from January through December for 2020 and 2021 indicated approximately an 80.9 percent increase in passenger throughput. When analyzing month-over-month data from January through July for 2021 and 2022, national passenger throughput increased nearly 43.9 percent.

As airlines experienced a decrease in passenger activity and fewer service routes being flown, several airlines opted to transition to larger airframes. This allowed for more passengers to be

¹ Transportation Security Administration. “TSA Checkpoint Travel Numbers (Current Year Versus Prior Years(s)/Same Weekday).” 18 August 2022. <https://www.tsa.gov/coronavirus/passenger-throughput>

flown during each flight, which subsequently decreased costs due to fewer operations. Recently, several airlines have begun reinstating routes that were temporarily put on hold.

Table 3-1 – TSA: Total Customer Throughput (National)

Month	2019	2020	2021	2022*	% Difference		
					2019 vs. 2020	2020 vs. 2021	2021 vs. 2022*
January	59,357,493	61,673,279	23,421,229	46,000,046	3.9%	-62.0%	96.4%
February	57,525,435	60,463,775	24,867,048	48,528,013	5.1%	-58.9%	95.1%
March	72,683,832	31,029,383	38,562,607	63,643,054	-57.3%	24.3%	65.0%
April	68,107,494	3,198,527	40,263,920	63,436,314	-95.3%	1158.8%	57.6%
May	74,452,226	7,347,527	49,883,982	67,182,736	-90.1%	578.9%	34.7%
June	76,668,787	14,755,057	56,712,872	68,163,881	-80.8%	284.4%	20.2%
July	79,332,046	20,823,298	63,188,017	70,290,673	-73.8%	203.4%	11.2%
August	74,445,793	21,515,106	57,484,123	-	-71.1%	167.2%	-
September	66,941,195	21,828,103	51,089,715	-	-67.4%	134.1%	-
October	72,108,333	25,716,680	57,162,404	-	-64.3%	122.3%	-
November	68,608,532	25,357,178	57,644,161	-	-63.0%	127.3%	-
December	70,250,692	26,417,472	58,863,955	-	-62.4%	122.8%	-
Total	840,481,858	320,125,385	579,144,033	427,244,717*	-61.9%	80.9%	43.9%**

*Activity through July 31, 2022.

**Comparison of January-July 2021 (296,899,675 passengers) vs. January-July 2022 (427,244,717 passengers).

Source: Transportation Security Administration, CHA, 2022.

Impact at AVL

As shown in **Table 3-2**, upward trends in passenger enplanements are also being experienced at AVL. Enplanements were higher month-over-month from March 2021 to June 2022 when compared to the respective months in the preceding year. Month-over-month data from January through December for 2020 and 2021 indicated approximately a 102 percent increase in passenger enplanements.

Based on conversations with the GARAA, and in line with upcoming airline service schedules and recent trends, enplanements are expected to continue increasing with the anticipation of surpassing the FAA 2021 TAF at the end of the year (2022) before stabilizing.

As shown in **Table 3-3**, commercial operations at AVL were also negatively impacted by COVID-19, with operations decreasing by approximately 38.2 percent in 2020 when compared to activity the previous year. As previously discussed, the decrease in operations was a direct result of airlines temporarily cutting back service routes and altering fleet mixes as airlines transitioned to larger bodied aircraft.

Table 3-2 – Covid-19: Impact on Enplanements at AVL

Month	2019	2020	2021	2022*	% Difference		
					2019 vs. 2020	2020 vs. 2021	2021 vs. 2022*
January	45,770	58,017	22,658	41,920	26.8%	-60.9%	85.0%
February	43,707	52,746	22,977	47,636	20.7%	-56.4%	107.3%
March	60,805	31,418	39,029	67,677	-48.3%	24.2%	73.4%
April	61,230	1,210	48,371	70,179	-98.0%	3897.6%	45.1%
May	71,960	7,717	62,546	79,946	-89.3%	710.5%	27.8%
June	77,313	20,183	77,489	90,410	-73.9%	283.9%	16.7%
July	81,749	27,034	91,609	-	-66.9%	238.9%	-
August	75,825	27,853	71,735	-	-63.3%	157.5%	-
September	69,344	25,151	65,120	-	-63.7%	158.9%	-
October	81,495	38,732	85,762	-	-52.5%	121.4%	-
November	69,003	34,804	65,431	-	-49.6%	88.0%	-
December	70,892	29,543	63,288	-	-58.3%	114.2%	-
Total	809,093	354,408	716,015	397,768*	-56.2%	102.0%	45.7%**

*Activity through June 30, 2022.

**Comparison of January-June 2021 (273,070 enplanements) vs. January-June 2022 (397,768 enplanements).

Source: GARAA, CHA, 2022.

Table 3-3 – Covid-19: Impact on Commercial Operations at AVL

Month	Commercial Operations	% Difference
2019	21,150	-
2020	13,064	-38.2%
2021	20,328	55.6%

Source: GARAA, CHA, 2022.

3.2.2 COVID-19 Impact on General Aviation

GA users were not impacted by the COVID-19 pandemic to the same extent of commercial operators. While travel and route restrictions were placed on the commercial industry, route restrictions were not placed on civil aviation. However, business and travel restrictions did have an impact on itinerant GA travel, though recreational flying has largely been stable throughout the pandemic. In addition, during 2020 GA pilots began assisting with COVID-19 relief efforts by aiding in delivery of personal protective equipment to medical facilities.

Industry Impacts

As shown in **Figure 3-1**, GA Aircraft Shipment Reports, published by the General Aviation

Figure 3-1 – GA Aircraft Shipments

Aircraft Shipments & Billings: Comparison of Last THREE Full Years				
AIRPLANE SHIPMENTS	2019	2020	2021	% CH. 20-21
Piston Airplanes (*)	1,336	1,332	1,409	+5.8%
Turboprop Airplanes	525	443	527	+19.0%
Business Jets	809	644	710	+10.2%
TOTAL AIRPLANE SHIPMENTS	2,670	2,419	2,646	+9.4%
TOTAL AIRPLANE BILLINGS	\$23.5B	\$20.0B	\$21.6B	+7.6%
HELICOPTERS SHIPMENTS	2019	2020	2021	% CHANGE 20-21
Piston Helicopters	179	142	181	+27.5%
Turbine Helicopters (*)	698	567	679	+19.8%
TOTAL HELICOPTER SHIPMENTS	877	709	860	+21.3%
TOTAL HELICOPTER BILLINGS	\$3.8B	\$3.4B	4.2B	+22.6%

Source: General Aviation Manufacturers Association.

Manufactures Association (GAMA), aircraft shipments in the United States declined from 2,670 aircraft in 2019 to 2,419 aircraft in 2020. In 2021, aircraft shipments improved by approximately 9.4 percent, with shipments totaling 2,646 aircraft².

Impact at AVL

Similar to the national GA industry, GA activity at AVL was not as heavily impacted as commercial activity. Based on conversations with Signature Flight Support (Signature) and data collected via the FAA Operations Network (OPSNET) and GARAA, GA activity experienced a decrease of approximately 16.0 percent from 2019 to 2020. Although experiencing a decrease in operations at the beginning of the pandemic, GA activity increased in 2021 by approximately 19.1 percent, surpassing activity prior to the pandemic. The trends regarding GA activity levels at AVL are further discussed in **Section 3.3.2**.

3.3 HISTORICAL AVIATION ACTIVITY LEVELS

3.3.1 Historical Enplanements

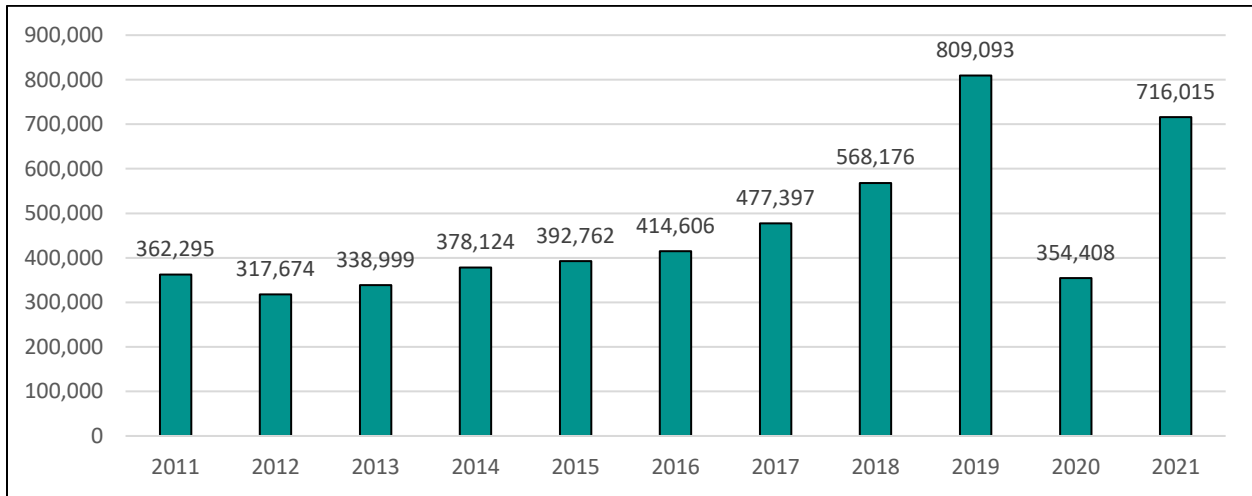
From 2011 through 2021, enplanements at AVL fluctuated alongside the entrance and exit of service operators, as well as with expansion into new market areas. In November 2011, Allegiant began offering non-stop service between AVL and Orlando, Florida. Although a new ultra-low-cost carrier (ULCC) was introduced at AVL, enplanements decreased approximately 12.3 percent from 2011 to 2012 as a result of airlines exiting AVL's market. In August 2011, Vision Airlines discontinued service at the Airport, which was soon followed by the loss of AirTran Airways in January 2012. In 2014, Allegiant expanded non-stop service to include new market areas, thus attributing to an increase in enplanements from the previous year, with the Airport seeing an approximate 15.1 percent increase.

In 2019, AVL experienced a record high number of passenger enplanements at 809,093. As was the case with the commercial service airports as a whole in the US, AVL saw a drastic decrease in passenger enplanements in 2020 as a direct impact of COVID-19, which resulted in extreme changes in services offered by airlines. From 2019 to 2020, enplanements at AVL dropped from 809,093 enplanements to 354,408 enplanements, or by approximately 56.2 percent, as a result of loss in services and frequencies.

AVL primarily caters to the leisure market. As discussed in the FAA Aerospace Forecast (2021-2041), 'domestic leisure travel has led the recovery.' This is evident at AVL. In 2021, airlines began increasing services and the public became more comfortable with traveling, thus enabling activity at the Airport to begin recovering. In 2021, enplanements were within approximately 10.9 percent of reaching 2019 activity levels, with 716,015 enplaned passengers. These trends are depicted in **Figure 3-2**.

² General Aviation Manufacturers Association. *Aircraft Shipments & Billings: Comparison of Last Three Full Years*. <https://gama.aero/facts-and-statistics/quarterly-shipments-and-billings/>. Accessed 18 May 2022.

Figure 3-2 – Historical Passenger Enplanements

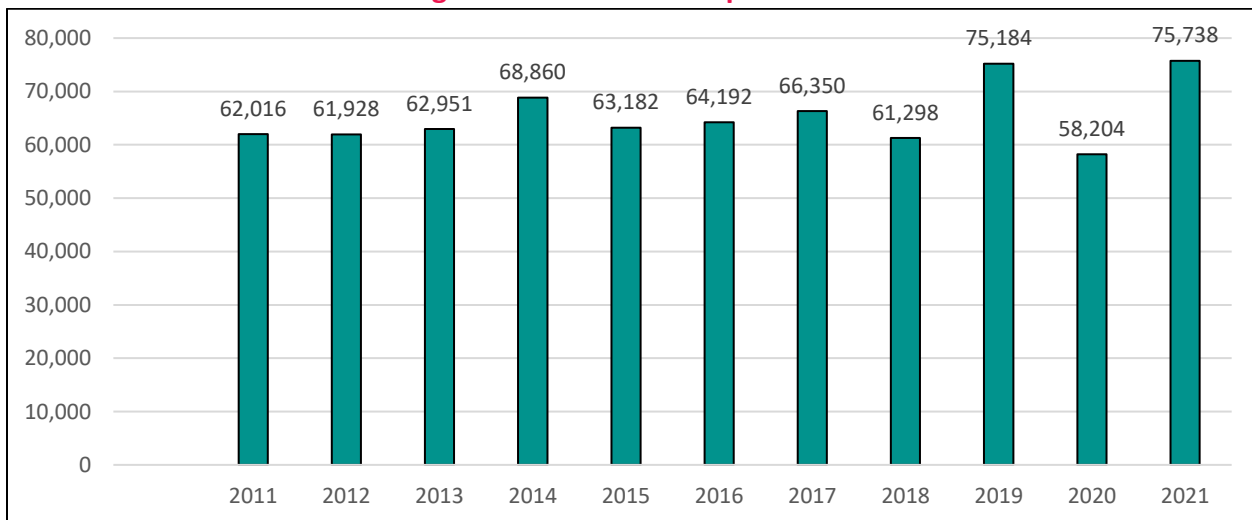


Source: GARAA, CHA, 2022.

3.3.2 Historical Operations

As shown in **Figure 3-3**, operations were relatively steady at AVL from 2011 through 2018, with operations ranging between 61,298 and 68,860. In 2019, operations reached a record peak with 75,184 operations before decreasing by approximately 22.6 percent to a nine-year historical low of 58,204 operations due to COVID-19. In 2021, commercial, GA, and military operations each increased, resulting in an overall increase in operations by approximately 30.1 percent with 75,738 operations—a new record high at AVL. The increase in commercial travel can be partially attributed to the return of commercial services and routes that were previously reduced, while factors leading to the increase of GA operations could be attributed to an increase in disposable income.

Figure 3-3 – Historical Operations



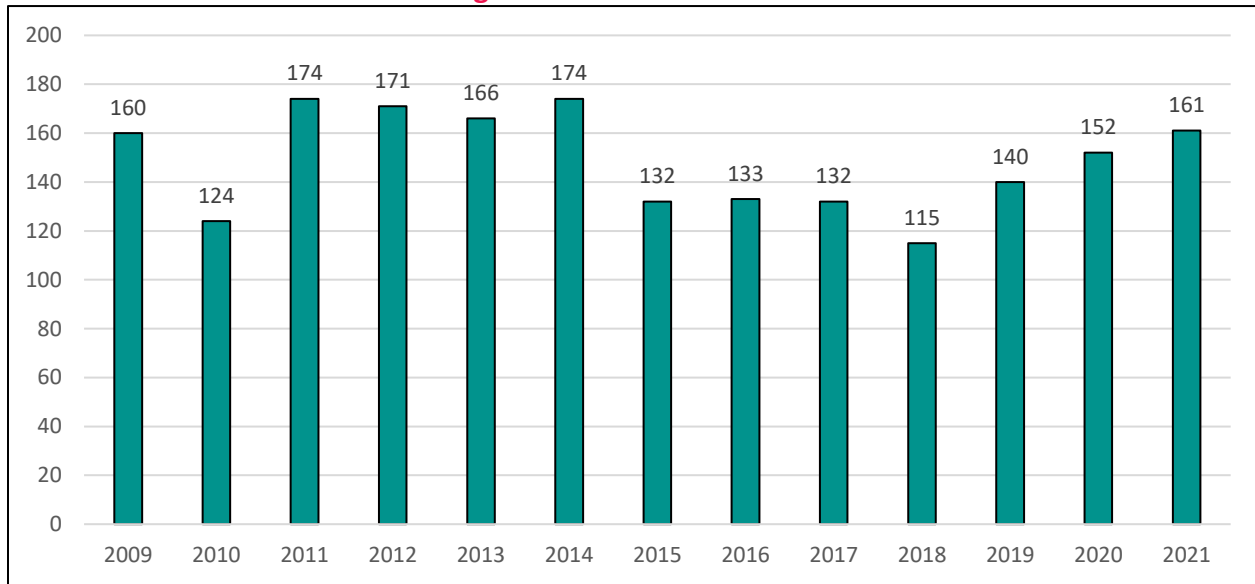
Note: 2011 through 2021 average activity breakdowns – Commercial Operations (24.3%), General Aviation Operations (69.1%), & Military Operations (6.6%).

Source: FAA OPSNET, GARAA, CHA, 2022.

3.3.3 Historical Based Aircraft

The number of based aircraft at AVL have experienced several periods of fluctuation between 2011 and 2021, as seen in **Figure 3-4**. Based aircraft were lowest in 2018 with 115 aircraft and highest in 2011 / 2014 at 174. In 2021, AVL had 161 full-time based aircraft (144 single-engine, 9 multi-engine, 5 jets, and 3 helicopters).

Figure 3-4 – Based Aircraft



Note: Based aircraft from 2009 through 2020 were provided by the FAA 2021 TAF, while based aircraft in 2021 were provided by Airport Master Record (Form 5010).

Source: FAA 2021 TAF, Airport Master Record (Form 5010), GARAA, CHA, 2022.

3.4 FACTORS INFLUENCING ACTIVITY AT AVL

As mentioned in **Chapter 1, Inventory**, the Authority completed a Terminal Building Assessment Study in 2018 to evaluate the aging of the existing terminal facility. It was ultimately recommended that the existing facility be replaced – a process that is currently concluding its design stage and is anticipated to be completed in 2026. This Study recommended a 12-gate facility by 2038. Furthermore, the Authority has recently completed a runway reconstruction program and development of a parking garage at the Airport.

As a result of the previously mentioned Study, the Authority began programming and designing a new terminal facility in the same location as the existing one, with development to occur in phases. These efforts include significant financial investments by the Authority with the intent to accommodate the expected increase in passenger demand, as well as a new entrant airline and increases in service at AVL.

In addition to the facility improvements, several external factors were included in the evaluation of passenger activity at the Airport:

- ✈ Actual passenger enplanement numbers indicate AVL passenger enplanements are on track to recover in 2022.
- ✈ Socioeconomic growth in the Asheville MSA (population, per capita income, etc.).
- ✈ The presence of a growing ULCC market at the Airport (Allegiant, Sun Country, etc.) further detailed in subsequent sections.
- ✈ The previously mentioned significant investments by the Airport Authority to improve the terminal to accommodate long-term passenger growth.
- ✈ The recent growth in air service from new airlines [Sun Country (October 2021) and Jet Blue (June 2022)], as well as added and returning routes via existing airlines (refer to **Section 3.7.1**).

3.5 FORECAST DATA SOURCES

Information factored into both planning and forecasting efforts included aviation operational trends and anticipated changes in aircraft fleet mix operating at AVL. The data and assumptions used to define the baseline conditions and future activity trends were derived from multiple sources, including:

- ✈ Airport Management – Airport management provided the most accurate historical data for the Airport. This included passenger and operational activity, facility needs, gate requirements, fleet mix transition, and upcoming service growth. Recent activity data at AVL was provided by the Authority.
- ✈ FAA 2021 Terminal Area Forecast (TAF)³ & FAA 2022 Draft TAF⁴ - TAF activity estimates are derived by the FAA from national estimates of aviation activity. These estimates are then assigned to individual airports based upon multiple market and forecast factors. The FAA looks at local and national economic conditions, as well as trends within the aviation industry, to develop each forecast.
- ✈ FAA Traffic Flow Management System Counts (TFMSC) – The FAA’s TFMSC contains air traffic activity data and fleet mix data for the National Aerospace System.
- ✈ FAA Operations Network (OPSNET) – This data system is maintained by the FAA and provides operation counts at towered airports within the National Airspace System.
- ✈ Airport Master Record (Form 5010) – This data and form can be accessed via the FAA’s Airport Data and Information Portal (ADIP) and includes airport and aeronautical data,

³ Note, the ‘FAA 2021 TAF’ was published in March 2022 and represents activity at AVL through 2020, with activity beyond 2020 representing the FAA’s activity projections.

⁴ Note, the ‘FAA 2022 Draft TAF’ has not been formally published but is included for comparison against the recommended Master Plan forecast.

organized by facility/airport. For the purposes of this Study, this data set was used to determine current based aircraft.

- ✈ Bureau of Transportation Statistics (Air Carriers: T-100) – The Bureau of Transportation Statistics (BTS), part of the Department of Transportation (DOT), provided statistical data relating to commercial aviation, multimodal freight activity, and transportation economics. The T-100 data contains market data reported by U.S. carriers, including the air carrier, flight origin and destination, equipment type and seat information, and number of enplaned passengers.
- ✈ Boeing Commercial Market Outlook (2021-2040) & Airbus Global Market Forecast (2021-2040) – These market outlooks provide information detailing future fleet mix transitions, such as new aircraft entering the market and future equipment retirements, for commercial carriers.
- ✈ Ailevon Pacific Aviation Consulting – Ailevon Pacific, the air service development consultant for AVL, provided insight and data on upcoming new and enhanced commercial air service at the Airport, as well as information regarding potential activity.
- ✈ Airline Management – Airline representatives provided insight on upcoming route and airframe changes, which were directly factored into the assumptions and methodologies of the demand projections herein.
- ✈ Fixed-Base Operator (FBO) Representatives – Representatives with Signature Flight Support, the sole FBO operator at AVL, provided insight on recent general aviation activity levels and based aircraft activity, as well as insight regarding plans for future growth.
- ✈ FAA Aerospace Forecast (FY 2021-2041) – This forecast provided an overview of aviation industry trends and expected growth for the commercial passenger air carrier and general aviation activity segments. National growth rates of enplanements, operations, and fleet mixes are provided over a 20-year forecast horizon. For the purposes of forecast development, the FAA Aerospace Forecasts were used as comparisons for the basis of determining the growth of the general aviation fleet. This forecast also provided insight into future air cargo growth trends on a national and international level.
- ✈ Woods & Poole Economics, Inc. – Woods & Poole Economics, Inc. is an independent firm that specializes in developing long-term economic and demographic projections, utilizing more than 900 economic and demographic variables. The database includes every state, Metropolitan Statistical Area (MSA), and county in the U.S. For the purposes of this Study, data contained within the 2021 State Profile for North Carolina was utilized, which contained historical data through 2019 and projections from 2020 to 2050.

3.6 SOCIOECONOMIC OVERVIEW

The factors that have the greatest impact on the growth prospects of an airport are the socioeconomic characteristics (i.e., population, employment, and personal income per capita) present within the airport’s catchment, or market, area.

An airport’s catchment area is defined as the locale in which an airport captures the majority of its uses. To determine the catchment area, an evaluation using socioeconomic factors was conducted to identify which airports the local area population are most likely to use based on proximity to other airports in the region⁵, with respect given to drive-time and demographics.

For the purposes of this Study, the catchment area for AVL consisted of the following counties within North Carolina (NC): Buncombe, Haywood, Henderson, Jackson, Madison, and Transylvania County. Socioeconomic factors were also analyzed for the Asheville Metropolitan Statistical Area (MSA)⁶, State of North Carolina, and the United States.

COVID-19 Disclaimer

Although 2019 represents the last year of historical socioeconomic data provided, Woods & Poole has continued to analyze the effects of COVID-19 on the economy and the impacts on the provided projections. Per Woods & Poole’s 2021 State Profile for North Carolina, “COVID-19 itself does not appear to have made a quantifiable long-term economic impact that would affect U.S. economic growth beyond 2022 and through 2050.”

3.6.1 Population

From 2011 through 2021, the AVL catchment area, Asheville MSA, the State of North Carolina, and the United States all experienced steady growth year-over-year and are projected to continue steadily increasing throughout the forecast horizon.

In 2021, the Asheville MSA had an estimated population of approximately 470,200, while the AVL catchment area had an estimated population of approximately 549,760 (or approximately 5.1 percent of the State’s population). The Average Annual Growth Rate (AAGR) from 2011 to 2021 for the AVL catchment area and Asheville MSA were both approximately 0.9 percent, which were below the AAGR for the State (1.0 percent) but above the percent AAGR for the United States (0.6 percent).

The population growth rate from 2021 through 2041 for the catchment area and MSA are equally projected, with AAGRs of approximately 0.8 percent, which are both also lower than the AAGR for the State (0.9 percent) but higher than the national AAGR of 0.6 percent. The lesser growth rate of the catchment area and MSA when compared to the State indicates that the Airport is dependent upon more than resident and seasonal/leisure travelers for passenger activity growth

⁵ Refer to Chapter 1, *Inventory*, Section 1.2.2 – Location and Service Area

⁶ Per Woods & Poole Economics, Inc., the Asheville, NC MSA consists of the following locations: Buncombe, NC; Haywood, NC; Henderson, NC; and Madison, NC.

and relies on passenger leakage from nearby airports, such as from Charlotte Douglas International Airport (CLT) and Greenville-Spartanburg International Airport (GSP). According to AVL’s previous Leakage Study, approximately 83 percent of AVL’s originating passengers resided in the Airport’s catchment area. These trends are depicted in **Table 3-4** and **Figure 3-5**.

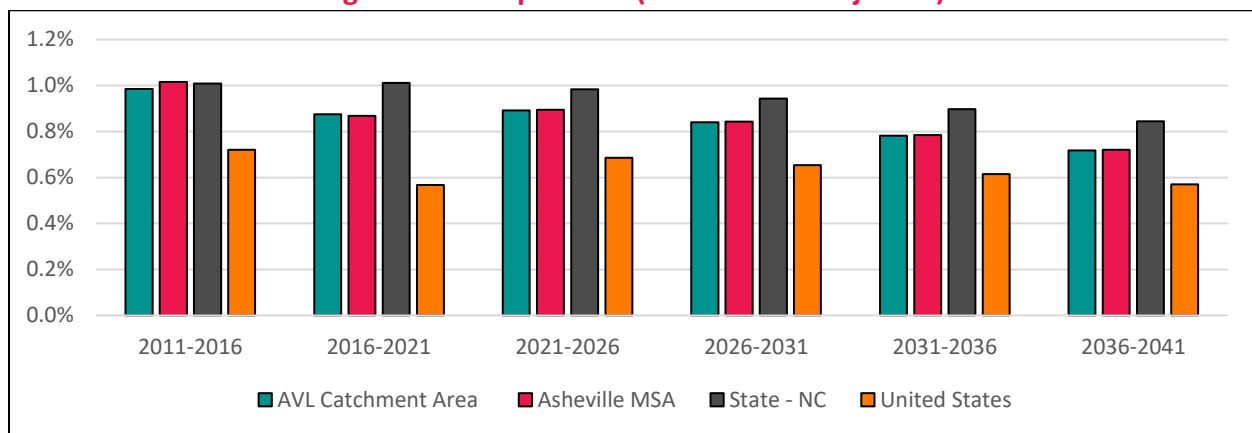
Table 3-4 – Population (Historical & Projected)

Year	AVL Catchment Area	AAGR	Asheville MSA	AAGR	State - NC	AAGR	United States	AAGR
Historical								
2011	501,160	-	428,113	-	9,657,592	-	311,556,806	-
2016	526,325	1.0%	450,310	1.0%	10,154,788	1.0%	322,946,138	0.7%
2021	549,762	0.9%	470,196	0.9%	10,679,082	1.0%	332,219,513	0.6%
AAGR 2011-2021	-	0.9%	-	0.9%	-	1.0%	-	0.6%
Projected								
2026	574,725	0.9%	491,597	0.9%	11,214,397	1.0%	343,776,826	0.7%
2031	599,300	0.8%	512,678	0.8%	11,753,489	0.9%	355,171,046	0.7%
2036	623,109	0.8%	533,118	0.8%	12,290,084	0.9%	366,230,596	0.6%
2041	645,805	0.7%	552,621	0.7%	12,818,124	0.8%	376,799,404	0.6%
AAGR 2021-2041	-	0.8%	-	0.8%	-	0.9%	-	0.6%
Growth Rate 2021-2041	-	17.5%	-	17.5%	-	20.0%	-	13.4%

Note: Average Annual Growth Rate (AAGR); Metropolitan Statistical Area (MSA)

Source: Woods & Poole Economics, Inc., CHA, 2022.

Figure 3-5 – Population (Historical & Projected)



Note: Depicts Average Annual Growth Rates (AAGR).

Source: Woods & Poole Economics, Inc., CHA, 2022.

3.6.2 Employment

In 2020, the number of jobs within the AVL catchment decreased by approximately 9.2 percent, which could have possibly been a result of COVID-19. Despite a decrease in jobs the previous year, the number of jobs increased in 2021 to approximately 338,000, exceeding the number of jobs in 2019 (approximately 328,000). Jobs within the AVL catchment area in 2021 represented approximately 5.3 percent of all jobs within North Carolina.

Like the AVL catchment area, the Asheville MSA, North Carolina, and United States experienced a decrease in jobs in 2020, followed by increases in 2021 that exceeded the number of jobs

available prior to COVID-19. The number of jobs prior to COVID-19 (2019) and in 2020 were as follows:

- ✈ Asheville MSA
 - 2019 (288,000 jobs); 2020 (260,200 jobs)
- ✈ North Carolina
 - 2019 (6,189,000 jobs); 2020 (5,820,800 jobs)
- ✈ United States
 - 2019 (203,809,500 jobs); 2020 (191,619,500 jobs)

As depicted in **Table 3-5**, the number of jobs within the AVL catchment area, Asheville MSA, North Carolina, and United States are each expected to steadily increase throughout the forecast horizon.

Table 3-5 – Employment (Historical & Projected)

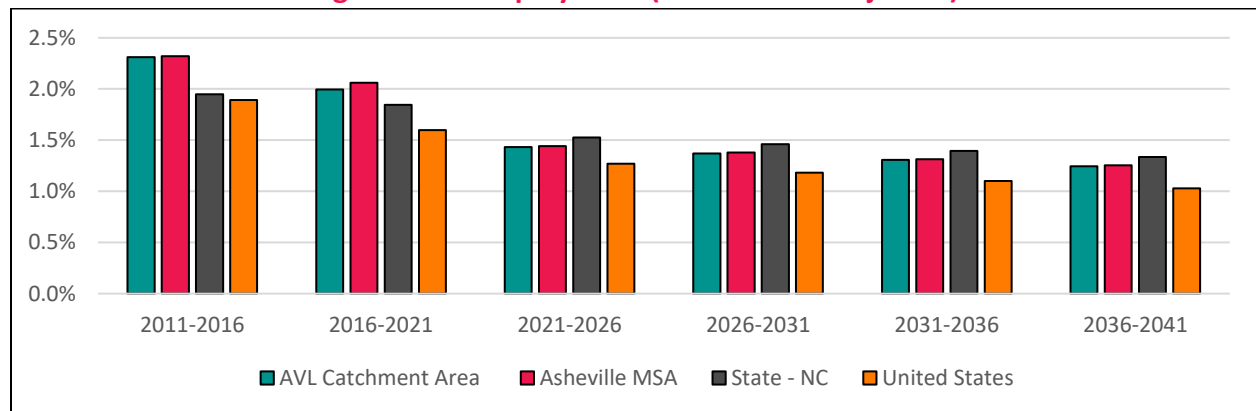
Year	AVL Catchment Area	AAGR	Asheville MSA	AAGR	State - NC	AAGR	United States	AAGR
Historical								
2011	273,126	-	238,794	-	5,292,806	-	176,091,617	-
2016	306,166	2.3%	267,795	2.3%	5,829,004	1.9%	193,378,928	1.9%
2021	337,951	2.0%	296,550	2.1%	6,386,673	1.8%	209,319,103	1.6%
AAGR 2011-2021	-	2.2%	-	2.2%	-	1.9%	-	1.7%
Projected								
2026	362,878	1.4%	318,563	1.4%	6,889,180	1.5%	222,948,195	1.3%
2031	388,434	1.4%	341,149	1.4%	7,407,165	1.5%	236,437,342	1.2%
2036	414,463	1.3%	364,160	1.3%	7,938,288	1.4%	249,724,570	1.1%
2041	440,923	1.2%	387,548	1.3%	8,482,533	1.3%	262,828,819	1.0%
AAGR 2021-2041	-	1.3%	-	1.3%	-	1.4%	-	1.1%
Growth Rate 2021-2041	-	30.5%	-	30.7%	-	32.8%	-	25.6%

Note 1: Table depicts number of jobs within the designated area.

Note 2: Average Annual Growth Rate (AAGR); Metropolitan Statistical Area (MSA)

Source: Woods & Poole Economics, Inc., CHA, 2022.

Figure 3-6 – Employment (Historical & Projected)



Note: Depicts Average Annual Growth Rates (AAGR).

Source: Woods & Poole Economics, Inc., CHA, 2022.

3.6.3 Personal Income Per Capita

Despite experiencing a decrease in jobs from 2019 to 2020, personal income per capita within the AVL catchment area, Asheville MSA, North Carolina, and United States increased consistently through 2021.

In 2021, the AVL catchment area had an average personal income per capita of approximately \$44,700, which was lower than that of the Asheville MSA, North Carolina, and United States. The Asheville MSA had a personal income per capita of approximately \$50,670, which was similar to the State of North Carolina (approximately \$51,240), but about 16.3 percent less than the United States (\$60,540).

The AVL catchment area, Asheville MSA, and United States are projected to grow by approximately 4.7 percent annually throughout the forecast horizon, which is slightly slower than the State of North Carolina’s projected annual growth (4.8 percent).

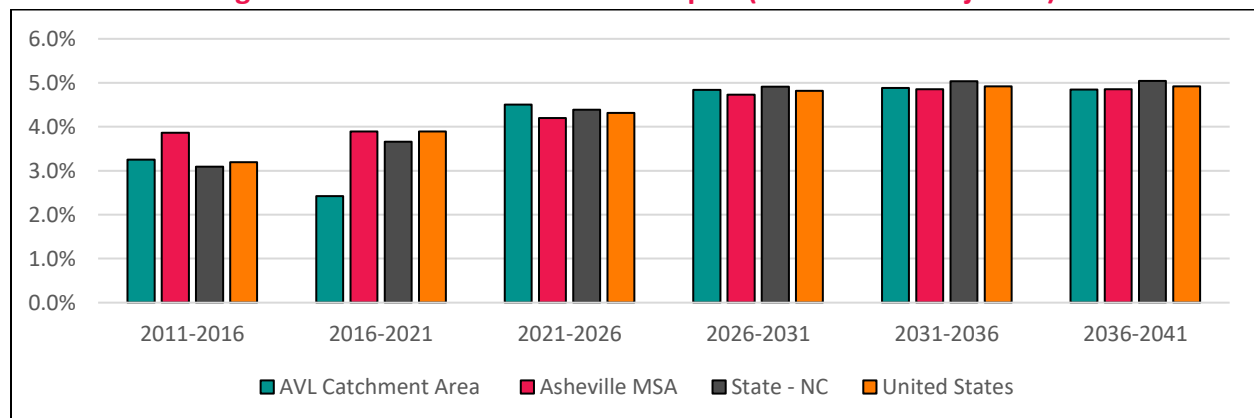
Table 3-6 – Personal Income Per Capita (Historical & Projected)

Year	AVL Catchment Area	AAGR	Asheville MSA	AAGR	State - NC	AAGR	United States	AAGR
Historical								
2011	\$31,111	-	\$34,630	-	\$36,764	-	\$42,739	-
2016	\$37,221	3.3%	\$41,862	3.9%	\$42,816	3.1%	\$50,014	3.2%
2021	\$44,699	2.4%	\$50,667	3.9%	\$51,242	3.7%	\$60,536	3.9%
AAGR 2011-2021	-	3.7%	-	3.9%	-	3.4%	-	3.5%
Projected								
2026	\$54,968	4.5%	\$62,236	4.2%	\$63,521	4.4%	\$74,774	4.3%
2031	\$69,318	4.8%	\$78,409	4.7%	\$80,729	4.9%	\$94,592	4.8%
2036	\$87,914	4.9%	\$99,369	4.9%	\$103,195	5.0%	\$120,277	4.9%
2041	\$111,498	4.8%	\$125,954	4.9%	\$131,956	5.0%	\$152,921	4.9%
AAGR 2021-2041	-	4.7%	-	4.7%	-	4.8%	-	4.7%
Growth Rate 2021-2041	-	149.4%	-	148.6%	-	157.5%	-	152.6%

Note 1: Depicts average personal income per capita. Note 2: Average Annual Growth Rate (AAGR);

Source: Woods & Poole Economics, Inc., CHA, 2022.

Figure 3-7 – Personal Income Per Capita (Historical & Projected)



Note: Depicts Average Annual Growth Rates (AAGR).

Source: Woods & Poole Economics, Inc., CHA, 2022.

3.7 COMMERCIAL ACTIVITY FORECASTS

To determine the facility sizing requirements necessary to adequately accommodate the current and future activity demand at AVL, a forecast of annual enplaned passengers and annual commercial aircraft operations was developed. The prime indicator of activity demand for a commercial service airport is the number of annual enplaned passengers, as enplanements drive passenger terminal sizing requirements, and to a lesser extent, commercial carrier operations and fleet mix. This section provides the methodologies for the development of the commercial enplanements at AVL over the 20-year planning horizon.

3.7.1 Commercial Enplanements Forecast

Enplanements are the primary measure of a commercial service airport’s passenger activity and are key factors for terminal building and parking facility requirements. In addition to being an important trend tracking tool for airport management, an airport’s reported annual enplanements are also used by the FAA to calculate Airport Improvement Program (AIP) passenger entitlement funding through an apportionment formula. For the purposes of this Study, forecasted enplanements serve as the basis for both the Airport’s facility requirements and financial projections. Several forecast methodologies and statistical analyses were utilized to provide a range of potential passenger activity levels at AVL. From these projections, a recommended forecast was developed that represents the most reasonable projection of future activity based on existing data and current trends in passenger activity. Each of the methodologies that were analyzed, along with the accompanying enplanement forecasts, are described in the subsequent sections.

FAA TAF-Based Growth Scenario

The FAA TAF-based growth scenario (**Table 3-7**) methodology assumed the FAA 2021 TAF’s projected year-over-year growth from 2021 through 2041 for enplanements and applied that assumption to actual airport-reported data. Per the FAA 2021 TAF, enplanements in 2021 at AVL were projected at 591,035; however, actual enplanements were 716,015. The year-over-year TAF growth rate was then applied to the actual 716,015 enplanements and projected through 2041 assuming the TAF growth rate for the respective years. The result of this methodology projected 1,482,177 enplanements by 2041, with an overall average annual growth rate of approximately 3.7 percent.

Table 3-7 – FAA TAF-Based Growth Scenario (Enplanements)

Year	FAA 2021 TAF	TAF-Based Scenario
2021	591,035	716,015
2026	928,427	1,124,752
2031	1,032,306	1,250,597
2036	1,131,805	1,371,136
2041	1,223,464	1,482,177
AAGR 2021-2041	3.7%	3.7%
Growth Rate 2021-2041	107.0%	107.0%

Note: Average Annual Growth Rate (AAGR).

Source: FAA 2021 TAF, GARAA, CHA, 2022.

Historical Trend Scenario

For the purpose of the historical trend forecast scenario, it was assumed that enplanements would grow at the AAGR of enplanements from 2011 through 2021 which was approximately 7.0 percent. As shown in **Table 3-8**, this resulted in a projected 290.6 percent growth in enplanements over the 20-year planning horizon.

Upon further evaluation, it appears likely that enplanements will increase at a strong rate in the short-term (through 2024) as the Airport continues to rapidly recover; however, it is not likely that enplanements will continue this rapid rate of growth during the forecast horizon once activity has recovered. Thus, the historical trend analysis was not chosen to represent the recommended enplanements forecast.

Table 3-8 –Historical Trend Scenario (Enplanements)

Year	FAA 2021 TAF	Historical Trend (10-Year)
2021	591,035	716,015
2026	928,427	1,006,500
2031	1,032,306	1,415,100
2036	1,131,805	1,989,400
2041	1,223,464	2,796,600
AAGR 2021-2041	3.7%	7.0%
Growth Rate 2021-2041	107.0%	290.6%

Note: Average Annual Growth Rate (AAGR).

Source: GARAA, CHA, 2022.

Regression Scenarios

The regression-based scenarios examined passenger activity to determine if a causal relationship exists between the passenger activity levels and the socioeconomic conditions prevalent during that period. Several different regression analyses were performed for each of the pre-determined periods. The socioeconomic factors that were analyzed included population, income, and employment. The output of a regression analysis is the ‘coefficient of determination,’ or R^2 , which ranges from 0 to 1.0. If the R^2 of an analysis falls between 0.85 and 1.0, there is a strong statistical correlation; if it falls below 0.85, there is less correlation. In other words, the higher the R^2 value, the stronger the correlation is between the variables.

For the purpose of this forecast, three separate periods were examined: 10-year historical period (2011-2021), pre-COVID (2011-2019), and excluding COVID (2011-2019 and 2021). The results of each scenario are summarized in **Table 3-9**.

Regression Scenario 1: 10-Year Historical Period (2011-2021)

The first regression scenario looked at the relationships between socioeconomic conditions and passenger enplanements over a 10-year historical period (2011 through 2021). This period took into consideration conditions prior to COVID, during peak COVID intervals, and during economic recovery over the past year.

- ✈ Population-Based Regression: R^2 -value = 0.50
- ✈ Employment-Based Regression: R^2 -value = 0.80
- ✈ Income-Based Regression: R^2 -value = 0.48
- ✈ Population-Income-Based Regression: R^2 -value = 0.51
- ✈ Employment-Income-Based Regression: R^2 -value = 0.82
- ✈ Population-Employment-Income-Based Regression: R^2 -value = 0.86

Regression Scenario 2: Pre-COVID (2011-2019)

The second scenario only examined conditions prior to COVID, as COVID greatly impacted the economy and enplanements.

- ✈ Population-Based Regression: R^2 -value = 0.71
- ✈ Employment-Based Regression: R^2 -value = 0.76
- ✈ Income-Based Regression: R^2 -value = 0.76
- ✈ Population-Income-Based Regression: R^2 -value = 0.78
- ✈ Employment-Income-Based Regression: R^2 -value = 0.76
- ✈ Population-Employment-Income-Based Regression: R^2 -value = 0.85

Regression Scenario 3: Excluding COVID (2011-2019 & 2021)

The third regression scenario examined conditions prior to COVID (2011 through 2019), as well as COVID recovery (2021).

- ✈ Population-Based Regression: R^2 -value = 0.79
- ✈ Employment-Based Regression: R^2 -value = 0.82
- ✈ Income-Based Regression: R^2 -value = 0.81
- ✈ Population-Income-Based Regression: R^2 -value = 0.82
- ✈ Employment-Income-Based Regression: R^2 -value = 0.82
- ✈ Population-Employment-Income-Based Regression: R^2 -value = 0.89

Regression Summary

The population-employment-income-based scenarios were the only regression scenarios with R^2 values that indicated strong correlations between historical enplanements at AVL and the socioeconomic factors within the Airport's catchment area; therefore, the remaining regression scenarios were not chosen to represent the recommended enplanements forecast.

Although the R^2 values for the population-employment-income-based scenarios indicated strong correlations between the socioeconomic factors and enplanements, the scenarios resulted in unrealistic trends. In the first scenario, enplanements were projected to increase with an average annual growth rate of approximately 7.8 percent throughout the forecast horizon. While the

growth may be realistic in the short-term, it is not likely that enplanements would sustain that level of rapid growth long-term. In the second and third scenarios, enplanements were projected to decrease by approximately 4.9 and 3.0 percent, respectively. With planned route expansions in the short-term as the airline industry recovers and with the entrance of a new air carrier (Jet Blue) at AVL, enplanements are not expected to decrease; therefore, the population-employment-income-based scenarios were also eliminated from consideration as the recommended enplanements forecast.

Similar to historic trends, it is not surprising that the regression analyses did not provide realistic projections of future activity at AVL. As enplanements have had significant variability in the past 10-years, with significant swings both up and down, correlations with more stable socioeconomic variables does not have much predictive value.

Table 3-9 – Regression Scenarios (Enplanements)

Year	FAA 2021 TAF	Regressions					
		Population-Based	Employment-Based	Income-Based	Population-Income-Based	Employment-Income-Based	Population-Employment-Income-Based
Regression Scenario 1: 10-Year Historical Period (2011-2021)							
2021	591,035	716,015	716,015	716,015	716,015	716,015	716,015
2026	928,427	806,506	884,884	888,586	707,533	816,968	1,039,403
2031	1,032,306	975,754	1,059,547	1,235,902	680,597	879,426	1,530,403
2036	1,131,805	1,139,727	1,237,443	1,686,000	532,854	895,814	2,236,229
2041	1,223,464	1,296,034	1,418,284	2,256,826	240,215	856,954	3,196,947
AAGR 2021-2041	3.7%	3.0%	3.5%	5.9%	-5.3%	0.9%	7.8%
Growth Rate 2021-2041	107.0%	81.0%	98.1%	215.2%	-66.5%	19.7%	346.5%
Regression Scenario 2: Pre-COVID (2011-2019)							
2021	591,035	716,015	716,015	716,015	716,015	716,015	716,015
2026	928,427	942,921	892,889	1,132,415	1,355,285	1,063,610	536,912
2031	1,032,306	1,165,650	1,066,987	1,649,118	2,245,329	1,481,070	397,035
2036	1,131,805	1,381,435	1,244,307	2,318,728	3,497,825	2,007,947	301,488
2041	1,223,464	1,587,134	1,424,563	3,167,946	5,178,689	2,663,099	262,978
AAGR 2021-2041	3.7%	4.1%	3.5%	7.7%	10.4%	6.8%	-4.9%
Growth Rate 2021-2041	107.0%	121.7%	99.0%	342.4%	623.3%	271.9%	-63.3%
Regression Scenario 3: Excluding COVID (2011-2019 & 2021)							
2021	591,035	716,015	716,015	716,015	716,015	716,015	716,015
2026	928,427	942,487	888,783	1,091,135	1,189,524	957,971	556,416
2031	1,032,306	1,165,039	1,061,453	1,578,739	1,863,624	1,237,304	441,445
2036	1,131,805	1,380,654	1,237,320	2,210,641	2,790,875	1,567,459	380,591
2041	1,223,464	1,586,189	1,416,098	3,012,035	4,016,903	1,956,751	388,298
AAGR 2021-2041	3.7%	4.1%	3.5%	7.4%	9.0%	5.2%	-3.0%
Growth Rate 2021-2041	107.0%	121.5%	97.8%	320.7%	461.0%	173.3%	-45.8%

Note: Average Annual Growth Rate (AAGR).

Source: FAA 2021 TAF, Woods & Poole Economics, GARAA, CHA, 2022.

Econometric Scenarios

As defined by Merriam-Webster, econometrics is “the application of statistical methods to the study of economic data and problems.”⁷ The econometric scenarios were a result of examining the year-over-year socioeconomic projections and applying incremental growth rates to AVL enplanements throughout the forecast horizon. For the purposes of this forecast, the following econometric analyses were performed: population-based, employment-based, and income-based.

As previously stated, it is anticipated that enplanements will likely increase at a rapid rate in the short-term as the Airport recovers from COVID-related activity loss, followed by a more conservative growth in the medium- to long-term. Socioeconomic trends can correlate to the rate of increase in future activity but are not the only contributing factors to activity growth. Thus, the econometric scenarios were not chosen to represent future activity at the Airport. This is due to the scenarios being limited to only socioeconomic factors, rather than the broader range of elements that are anticipated to have the most influence on the number of enplaned passengers (i.e., changes in service routes, new services providers, growth in tourism, etc.) at the Airport.

Table 3-10 – Econometric Scenarios (Enplanements)

Year	FAA 2021 TAF	Econometrics		
		Population Based	Employment- Based	Income- Based
2021	591,035	716,015	716,015	716,015
2026	928,427	748,527	768,828	880,515
2031	1,032,306	780,534	822,973	1,110,377
2036	1,131,805	811,543	878,121	1,408,261
2041	1,223,464	841,102	934,181	1,786,046
AAGR 2021-2041	3.7%	0.8%	1.3%	4.7%
Growth Rate 2021-2041	107.0%	17.5%	30.5%	149.4%

Note: Average Annual Growth Rate (AAGR).

Source: FAA 2021 TAF, Woods & Poole Economics, GARAA, CHA, 2022.

Air Service Econometric Scenarios

The air service econometric scenarios were more qualitative in nature and based on familiarity with local conditions, specific plans of airlines (both announced and anticipated), and a number of logical assumptions. To develop these forecasts, interviews were conducted with the Greater Asheville Regional Airport Authority (GARAA) staff and Airport stakeholders. Potential air service developments occurring during the forecast horizon were evaluated, including expanded services to existing destinations, services to new destinations, and entrant airlines (i.e., Jet Blue and other potential service providers). Additional elements that were analyzed included historical activity trends, fleet mix, load factors, and econometric trends. The resulting forecasts are therefore

⁷ Merriam-Webster. *Econometric Definition & Meaning - Merriam-Webster*. <https://www.merriam-webster.com/dictionary/econometric>. Accessed 24 May 2022.

potential ‘scenarios’ of future activity. For this Master Plan Update, three such scenarios were evaluated: a medium-growth, medium-high-growth, and high-growth/ultimate.

Medium-Growth Scenario

The historical trend analysis was used as a foundation from 2022 through 2024, along with activity resulting from assumed increases in load factors. The Airport Authority provided information regarding known activity, including a new entrant airline (Jet Blue), route expansion via existing carriers, and the return of some services that were previously suspended due to COVID—resulting in an AAGR of approximately 11.5 percent from 2021 through 2024.

The returning activity and known ‘new’ activity to begin in 2022 and 2023 that were incorporated into this evaluation included:

- ✈ Returning Activity (Transitioning from seasonal, back to daily):
 - American: Philadelphia International Airport (PHL)
- ✈ New Seasonal Service:
 - American: Ronald Reagan Washington National Airport (DCA), LaGuardia Airport (LGA), Miami International Airport (MIA), Chicago O’Hare International Airport (ORD)
 - Jet Blue: Boston Logan International Airport (BOS)
 - Delta: Minneapolis-Saint Paul International Airport (MSP)
 - United: Newark Liberty International Airport (EWR)

Once enplanements were shown to surpass 1 million (in 2024), enplanements were projected by applying the average econometric AAGRs shown in **Table 3-10** (2.3%), thus increasing enplanements at a slower incremental growth rate. This results of this scenario are shown in **Table 3-11**.

Table 3-11 – Medium-Growth Air Service Econometric Scenario (Enplanements)

Year	FAA 2021 TAF	Medium-Growth
2021	591,035	716,015
2026	928,427	1,038,576
2031	1,032,306	1,162,182
2036	1,131,805	1,300,499
2041	1,223,464	1,455,279
AAGR 2021-2041	3.7%	3.6%
Growth Rate 2021-2041	107.0%	103.2%

Note: Average Annual Growth Rate (AAGR).
 Source: FAA 2021 TAF, Woods & Poole Economics, GARAA, CHA, 2022.

Medium-High Growth Enplanements Forecast⁸

The medium-high growth scenario (**Table 3-12**) was added onto the medium-growth air service econometric analysis to include assumptions regarding potential service activity such as expanded services, new markets, and the entrance of a new ULCC.

✈ Assumed Services to Begin in 2023:

- New daily, seasonal service (13-weeks) via an A220 with an 80 percent load factor, with the load factor increasing incrementally to 85 percent by 2041.
- New daily, year-round service via a 76-seat regional jet with an 80 percent load factor, with the load factor increasing incrementally to 85 percent by 2041.
- Assumed United’s services to IAD will resume.

✈ Assumed Services to Begin in 2024:

- Entrant of a new ULCC providing one flight to three new destinations for three days per week via an A320 with a 75 percent load factor, with the load factor increasing incrementally to 80 percent and with services transitioning to four days weekly by 2029 and five days weekly by approximately 2037.

Table 3-12 – Medium-High Growth Air Service Econometric Scenario (Enplanements)

Year	FAA 2021 TAF	Medium-High Growth
2021	591,035	716,015
2026	928,427	1,183,319
2031	1,032,306	1,322,750
2036	1,131,805	1,477,394
2041	1,223,464	1,649,002
AAGR 2021-2041	3.7%	4.3%
Growth Rate 2021-2041	107.0%	130.3%

Note: Average Annual Growth Rate (AAGR).

Source: FAA 2021 TAF, Woods & Poole Economics, GARAA, CHA, 2022.

High Growth/Ulimate Enplanements Forecast

The final scenario included all activity discussed in the medium-growth and the medium-high growth scenarios, and was built out to also include the entrance of two additional airlines in five-years (2026), thus resulting in the high-growth/ultimate scenario, shown in **Table 3-13**. One carrier was assumed to provide seasonal service (34 weeks), once daily, via a 76-seat regional jet. The second carrier was assumed to provide one daily flight to four new destinations year-round

⁸ Note, the services discussed as part of the medium-high growth and high-growth/ultimate scenarios were only assumptions and do not represent committed service routes or activity. The potential for these described services was evaluated to provide the Airport Authority with additional tools for planning future infrastructure and facility improvements.

via a B737-700. All routes for each carrier were assumed to begin with a load factor of 80 percent, which would later increase incrementally to 85 percent by the end of the forecast horizon.

Table 3-13 – High Growth/Ultimate Air Service Econometric Scenario (Enplanements)

Year	FAA 2021 TAF	High-Growth/Ultimate
2021	591,035	716,015
2026	928,427	1,364,356
2031	1,032,306	1,507,559
2036	1,131,805	1,665,974
2041	1,223,464	1,841,354
AAGR 2021-2041	3.7%	4.8%
Growth Rate 2021-2041	107.0%	157.2%

Note: Average Annual Growth Rate (AAGR).

Source: FAA 2021 TAF, Woods & Poole Economics, GARAA, CHA, 2022.

Recommended Enplanements Summary

After evaluating each scenario, the medium-growth air service econometric scenario was chosen to represent AVL’s recommended enplanements forecast, as this forecast was qualitative in nature. This forecast encompassed local economic and airline industry trends, as well as anticipated and announced changes in service routes specific to AVL. Historical activity, fleet mix, and changes in load factors were also incorporated within this forecast scenario. The comparison of the recommended forecast versus the FAA 2021 TAF and FAA 2022 Draft TAF can be found in **Section 3.10**. See **Appendix A** for the complete 20-year forecast.

Low-Growth Enplanements Forecast

To provide a range of potential passenger activity levels, the FAA 2021 TAF was chosen to represent the low-growth forecast. Although the overall growth rate is projected to be higher, this forecast was chosen as the low-growth forecast because it reflects a slower recovery, with enplanements not surpassing 2019 activity levels until 2023.

Alternate Enplanements Forecasts

To further provide a range of potential passenger activity levels, the medium-high growth and high-growth/ultimate air service econometric scenarios were chosen to represent alternate commercial enplanements forecasts, which represent growth beyond the recommended enplanements forecast. These forecasts built upon the recommended forecast to address varying levels of enplanements should potential air service developments occur within the forecast horizon (i.e., a new entrant airline, service to new markets, etc.). These alternate forecast scenarios will serve as the basis for future facility planning when examining facility requirements.

A summary of the low-growth, recommended, and alternate enplanements forecasts is presented in **Table 3-14**.

Table 3-14 – Enplanements Forecast Summary

Year	Low-Growth Enplanements	Recommended Enplanements	Alternate Forecasts	
	(FAA 2021 TAF)	(Medium-Growth)	(Medium-High Growth)	(High-Growth/Ultime)
2021	591,035	716,015	716,015	716,015
2026	928,427	1,038,576	1,183,319	1,364,356
2031	1,032,306	1,162,182	1,322,750	1,507,559
2036	1,131,805	1,300,499	1,477,394	1,665,974
2041	1,223,464	1,455,279	1,649,002	1,841,354
AAGR 2021-2041	3.7%	3.6%	4.3%	4.8%
Growth Rate 2021-2041	107.0%	103.2%	130.3%	157.2%

Source: FAA 2021 TAF, Woods & Poole Economics, GARAA, CHA, 2022.

3.7.2 Commercial Operations Forecast

In addition to determining projected passenger enplanements, a commercial operations forecast was developed to further determine the facility sizing requirements necessary to adequately accommodate the current and future activity demand at AVL. Commercial aircraft operations will influence the requirements for the passenger terminal and airside infrastructure. The total forecasted commercial operations are depicted in **Table 3-15**.

The average commercial load factor in 2021 was approximately 72.6 percent. The forecast of percentage of seats filled in 2022 was assumed to resume to pre-COVID levels, consistent with the average load factor for 2018 and 2019 (73.5 percent). This resulted in a projected increase of approximately 0.9 percent, which was assumed to incrementally increase in the short term. Aircraft size, seat configuration, and service routes were both taken into consideration when determining load factors.

In the short-term, departure seats were projected by evaluating known returning activity and ‘new’ activity announcements beginning in 2022 and 2023. Load factors that were projected when developing the preferred enplanements forecast were also taken into consideration when determining future departure seats, as well as industry trends regarding changes in fleet mix. For the purposes of this forecast, it was assumed that arrival seats would equal departure seats. To project commercial operations, total annual seats (departure and arrival seats) available by aircraft type were divided by the average number of seats for the respective aircraft.

Table 3-15 – Commercial Operations Forecast

Year	Departure Seats	Commercial Operations
2021	986,776	20,328
2026	1,415,957	26,054
2031	1,537,787	28,292
2036	1,670,099	30,723
2041	1,813,795	33,363
AAGR 2021-2041	3.1%	2.5%
Growth Rate 2021-2041	83.8%	64.1%

Note: Average Annual Growth Rate (AAGR).

Source: Bureau of Transportation Statistics (T-100 Data), GARAA, CHA, 2022.

3.7.3 Commercial Fleet Mix

The commercial aircraft fleet mix projections are a function of the scheduled commercial passenger air carriers that operate or are expected to operate at AVL during the forecast period. Industry trends (i.e., aircraft acquisitions, aircraft phase-outs, retirements, route demand, etc.) and forecast enplanement levels influence a carrier’s aircraft type and level of operations. This data was then coupled with the forecasted commercial air carrier operations to determine the number of annual departures by aircraft category to the greatest extent practical. The operational fleet mix forecast provided within this section serves as a practical planning tool for developing airside and terminal development initiatives.

When projecting the future commercial fleet mix at AVL, it was important to identify the overall market trends driving airline fleet mixes. Over the last few years, airlines began retiring older aircraft, while also beginning to phase out the use of smaller 50-seat aircraft—replacing them with larger 70- and 90-plus seat regional jets, as well as larger narrow-body aircraft. Due to COVID-19 impacts, and a decrease in passenger travel, several airlines began temporarily altering the fleet mixes being flown, decreasing the number of aircraft being purchased.

According to the Boeing Commercial Outlook (2021-2040), a 10-year forecast was developed which indicated that overall aircraft deliveries will be approximately 7 percent lower than was predicted prior to the pandemic, with widebody aircraft deliveries expected to be approximately 8 percent lower than in 2019. Over the next 20-years, Boeing predicts that single-aisle passenger aircraft will be the highest in demand through 2040, with these aircraft making up approximately 75 percent of future deliveries. Per the Airbus Global Market Forecast (2021-2040), Airbus is projected to deliver approximately 6,030 aircraft domestically, comprised of approximately 83.8 percent small aircraft (i.e., A220 & A320), 10.6 percent medium aircraft (i.e., A320XLR & A330neo), and 5.6 percent large aircraft (i.e., A350-900 & A350-1000).

This is reflected at AVL, as the Airport is expected to experience an increase in narrow-body aircraft such as the A320, B737, and CRJs. In line with industry trends, 50-seat aircraft are expected to be retired (i.e., CRJ-200, ERJ-145, etc.) and replaced with larger aircraft (i.e., E-175).

The projected commercial fleet mix by Aircraft Approach Category (AAC) category and Airplane Design Group (ADG) group at AVL is presented in **Table 3-16**.

Table 3-16 – Commercial Fleet Mix

AAC & ADG		2021	2026	2031	2036	2041
Subtotal by AAC	A	0	0	0	0	0
	B	0	0	0	0	0
	C (i.e., A220, A319, B717-200, B737-700, ERJ-145/175, etc.)	20,278	25,644	27,807	30,152	32,695
	D (i.e., B737-800/900, etc.)	50	410	486	571	668
Subtotal by ADG	I	0	0	0	0	0
	II (i.e., CRJ-200/700, ERJ 145, etc.)	6,656	3,412	3,705	4,024	4,370
	III (i.e., A220, A319/320, B737-700/800/900, etc.)	13,672	22,642	24,587	26,699	28,993
	IV	0	0	0	0	0

Source: Bureau of Transportation Statistics (T-100 Data), CHA, 2022.

3.8 GENERAL AVIATION ACTIVITY FORECASTS

General aviation (GA) includes all segments of the aviation industry except commercial air carriers/regional/commuter service, scheduled cargo, and military operations. GA represents the largest percentage of civil aircraft in the U.S. and accounts for most operations handled by towered and non-towered airports. GA activities include flight training, sightseeing, recreational, aerial photography, law enforcement, and medical flights, as well as business, corporate, and personal travel via air taxi charter operations. General aviation aircraft encompass a broad range of types: from single-engine piston aircraft to large corporate jets, as well as helicopters, gliders, and home-built/kit aircraft.

General aviation operations are further categorized as either itinerant or local operations. Local operations are those performed by aircraft that remain in the local traffic pattern or within a 20-mile radius of the tower. Local operations are commonly associated with training activity and flight instruction, while also including touch-and-go operations. Itinerant operations are arrivals or departures, other than local operations, performed by either based or transient aircraft that do not remain in the airport traffic pattern or within a 20-nautical mile radius.

3.8.1 Based Aircraft Forecast

The FAA provides multiple methodologies to be used to forecast GA based aircraft. To determine the most reasonable scenario for AVL, it was necessary to compare and eliminate those forecasts that did not support the key factors and variables that comprise the specific direction of the Airport and its market. This section provides the methodologies that were analyzed for the development of the forecast of GA based aircraft at AVL. As previously stated in **Section 3.3.3**, in 2021 AVL had 161 based aircraft.

FAA Aerospace Forecast Analysis

In the FAA Aerospace Forecast methodology, annual fleet mix growth projections—provided in the FAA Aerospace Forecasts (FY 2021 – 2041)—were used to project the number of based aircraft throughout the forecast period. This methodology assumed that AVL GA based aircraft will grow at the FAA projected national rate and maintain their respective share of fleet and operations throughout the forecast period, as shown in **Table 3-17**. The FAA Aerospace Forecast indicates that piston aircraft (single- and multi-engine) will steadily decrease, jet aircraft and helicopters are projected to increase presence at airports. Based aircraft at AVL are primarily comprised of piston aircraft, with jets and helicopters representing the smallest groupings. Founded on these national projected trends, and as shown in **Table 3-18**, single- and multi-engine aircraft at AVL would decrease by approximately 16.7 percent and 7.8 percent, respectively. Jet aircraft would increase by approximately 56.2 percent, and helicopters would increase by approximately 31.1 percent.

While AVL may experience a slight shift in based aircraft mix as jets replace piston aircraft, it is not likely that the shift away from single-engine aircraft will be as aggressive as indicated using

this methodology; therefore, this scenario was not chosen to represent future based aircraft at AVL.

Table 3-17 – FAA Aerospace National GA Fleet Growth Rates

Period	Single-Engine	Mutli-Engine	Jet	Helicopter
AAGR 2021-2026	-1.0%	-0.6%	2.6%	1.1%
AAGR 2026-2031	-0.9%	-0.4%	2.5%	1.4%
AAGR 2031-2036	-0.9%	-0.3%	2.1%	1.5%
AAGR 2036-2041	-0.8%	-0.3%	1.8%	1.5%

Note: Average Annual Growth Rate (AAGR).

Source: FAA Aerospace Forecast (2021-2041), CHA, 2022.

Table 3-18 – FAA Aerospace Forecast Analysis (AVL GA Based Aircraft)

Period	Single-Engine	Mutli-Engine	Jet	Helicopter	Total
2021	144	9	5	3	161
2026	137	9	6	3	155
2031	131	9	6	3	149
2036	125	8	7	4	144
2041	120	8	8	4	140
AAGR 2021-2041	-0.9%	-0.4%	2.3%	1.4%	-0.7%
Growth Rate 2021-2041	-16.7%	-7.8%	56.2%	31.1%	-13.1%

Note: Average Annual Growth Rate (AAGR).

Source: FAA Aerospace Forecast (2021-2041), Airport Master Record (Form 5010), CHA, 2022.

Econometrics Scenarios

The GA based aircraft econometric scenarios were a result of examining the year-over-year socioeconomic projections within the AVL catchment area, and then applying incremental growth rates to AVL based aircraft throughout the forecast horizon. A population-based, employment-based, and income-based scenario were all performed. The population-based and employment-based scenarios indicated conservative growth, while the income-based and population-employment-income based scenarios were more aggressive. The results of these scenarios are depicted in **Table 3-19**. After further evaluation, the econometric scenarios were not chosen to represent the preferred GA based aircraft forecast at AVL, as factors outside of just socioeconomics (such as national trends in fleet mix replacement) can impact based aircraft levels.

Table 3-19 – Econometric Scenarios (GA Based Aircraft)

Year	Population-Based	Employment-Based	Income-Based	Population-Employment-Income Based
2021	161	161	161	161
2026	168	173	198	179
2031	176	185	250	201
2036	182	197	317	226
2041	189	210	402	252
AAGR 2021-2041	0.8%	1.3%	4.7%	2.3%
Growth Rate 2021-2041	17.5%	30.5%	149.4%	56.8%

Note: Average Annual Growth Rate (AAGR).

Source: Woods & Poole Economics, Inc., Airport Master Record (Form 5010), CHA, 2022.

FAA TAF-Based Growth Scenario

The FAA TAF-based growth scenario methodology assumed the FAA 2021 TAF’s projected based aircraft year-over-year growth from 2021 through 2041 for AVL and applied that assumption to actual airport-reported data. Per the FAA 2021 TAF, based aircraft in 2021 at AVL were projected at 155 aircraft; however, the actual based aircraft count in 2021 was 161 aircraft. The year-over-year TAF growth rate for AVL based aircraft was then applied to the actual 161 based aircraft and projected through 2041, assuming the TAF growth rate for the respective years. The result of this methodology projected 223 based aircraft by 2041, which is was believed to be too aggressive. Thus, this scenario was not chosen to represent recommended based aircraft at AVL.

Table 3-20 – TAF-Based Growth Scenario (GA Based Aircraft)

Year	TAF-Based Growth
2021	161
2026	177
2031	192
2036	208
2041	223
AAGR 2021-2041	1.6%
Growth Rate 2021-2041	38.7%

Note: Average Annual Growth Rate (AAGR).

Source: FAA 2021 TAF (AVL), Airport Master Record (Form 5010), CHA, 2022.

FAA National TAF-Based Growth Scenario

The FAA National TAF-based growth scenario methodology assumed the FAA 2021 TAF’s projected based aircraft year-over-year growth from 2021 through 2041 for national based aircraft and applied that assumption to actual airport-reported data. For example, per the FAA’ national TAF, national based aircraft are projected to increase by approximately 0.86 percent from 2021 to 2022. This growth rate of 0.86 percent was applied to actual 2021 based aircraft (161) for a total of 162 based aircraft projected in 2022. This methodology was carried out through 2041.

As previously discussed in **Section 3.3.3**, the number of based aircraft at AVL has historically fluctuated; therefore, given the conservative growth of this scenario and that it encompasses local and national economic conditions, the National TAF-based growth scenario was chosen to represent the recommended GA based aircraft forecast at AVL.

It is important to note that growth in GA based aircraft will likely be tied directly to future GA hangar development projects. As additional hangar and based aircraft capacity is added, more aircraft will likely be attracted to the based count at AVL.

Table 3-21 – National TAF-Based Growth Scenario (GA Based Aircraft)

Period	Total
2021	161
2026	168
2031	175
2036	182
2041	190
AAGR 2021-2041	0.8%
Growth Rate 2021-2041	17.8%

Note: Average Annual Growth Rate (AAGR).
 Source: FAA 2021 TAF (National), Airport Master Record (Form 5010), CHA, 2022.

Based Aircraft by Type

To project the future breakdown of based aircraft by type at AVL, national based aircraft and projected trends regarding future general aviation fleet mix were considered, as well as fleet mix activity trends at AVL. The projected breakdown is depicted in **Table 3-22**.

Table 3-22 – Recommended GA Based Aircraft Forecast (By Aircraft Type)

Period	Single-Engine	Multi-Engine	Jet	Helicopter	Total
2021	144	9	5	3	161
2026	147	9	9	3	168
2031	150	10	12	3	175
2036	154	10	15	3	182
2041	157	11	19	3	190
AAGR 2021-2041	0.4%	1.0%	6.9%	0.0%	0.8%
Growth Rate 2021-2041	9.0%	22.2%	280.0%	0.0%	17.8%

Note: Average Annual Growth Rate (AAGR).
 Source: FAA 2021 TAF, Airport Master Record (Form 5010), CHA, 2022.

3.8.2 General Aviation Operations Forecast

Like commercial operations forecasts and GA based aircraft forecasts, more than one methodology exists that could be used to forecast GA operations. To determine the most plausible and reasonable scenario for AVL, it was necessary to compare and eliminate those forecasts that did not support the key factors and variables that comprise the specific operational environment at the Airport.

FAA TAF-Based Growth Scenario

The FAA TAF-based GA operations scenario assumed the FAA 2021 TAF’s projected annual growth from 2021 to 2041 for GA itinerant and local operations, and then independently applied those assumptions to actual airport-reported itinerant and local GA activity data. From 2021 to 2022, the FAA 2021 TAF projected itinerant GA operations to increase by approximately 0.1 percent. After 2022, itinerant operations were projected to remain static throughout the remainder of the forecast period, resulting in an AAGR from 2021 to 2041 of approximately 0.004 percent. Unlike itinerant GA operations, the FAA projected civil (local) GA operations to steadily increase throughout the forecast at an average annual rate of approximately 1.1 percent.

The results from applying these growth assumptions are shown in **Table 3-23**. This scenario was not chosen to represent future GA operations at AVL. Itinerant operations are expected to grow rather than remain static; therefore, the FAA’s AAGR projection is not predicted to be the most realistic representation of future general aviation activity.

Table 3-23 – TAF-Based Growth Scenario (GA Operations)

Year	TAF-Based Growth
2021	51,008
2026	53,849
2031	54,017
2036	54,186
2041	54,357
AAGR 2021-2041	0.3%
Growth Rate 2021-2041	6.6%

Note: Average Annual Growth Rate (AAGR).
Source: FAA 2021 TAF, FAA OPSNET, GARAA, CHA, 2022.

Historical Trend Scenario

The historical growth scenario was a time trend analysis that utilized the Airport’s historical activity as a metric to provide future growth projections. For the purposes of this forecast, data from 2011 through 2021 was analyzed.

From 2011 through 2021, AVL experienced fluctuations in GA activity, ranging between a low of 39,191 operations in 2012 and a high of 51,008 operations in 2021. The 10-year historical average annual growth rate (2.4 percent) was applied to 2021 actuals and assumed throughout the forecast horizon, resulting in an overall growth of 61.9 percent as presented in **Table 3-24**.

Due to the fluctuations in historical GA operations, it cannot be assumed that operations will reflect past trends; therefore, this scenario was not chosen to represent the preferred GA operations forecast at AVL.

Table 3-24 – Historical Trend Scenario (GA Operations)

Year	Historical Trend
2021	51,008
2026	57,533
2031	64,893
2036	73,194
2041	82,557
AAGR 2021-2041	2.4%
Growth Rate 2021-2041	61.9%

Note: Average Annual Growth Rate (AAGR).
Source: FAA OPSNET, GARAA, CHA, 2022.

Operations Per Based Aircraft Scenario

The Operations Per Based Aircraft (OPBA) scenario is a straightforward forecasting methodology which assumes the total number of annual operations is representative of the number of aircraft based at AVL. When projecting operations using OPBA for AVL, it was assumed that OPBA will remain static throughout the forecast period at levels consistent with actual activity in 2021 (317

operations per based aircraft). When applying the OPBA of 317 to the preferred based aircraft forecast, GA operations were projected to grow by approximately 0.8 percent annually as shown in **Table 3-25**.

Historically, local operations accounted for an average of 32 percent of all GA operations, which can often be linked to based aircraft activity. Given the high makeup of local activity, it can be assumed that based aircraft will drive GA operations at AVL; therefore, this scenario was chosen to represent the preferred GA operations forecast.

Table 3-25 – Operations Per Based Aircraft (GA Operations)

Year	Based Aircraft (Recommended)	GA Operations	OPBA
2021	161	51,008	317
2026	168	53,256	317
2031	175	55,475	317
2036	182	57,694	317
2041	190	60,230	317
AAGR 2021-2041	0.8%	0.8%	-
Growth Rate 2021-2041	18.0%	18.1%	-

Note: Average Annual Growth Rate (AAGR).

Source: FAA OPSNET, GARAA, CHA, 2022.

Projected GA operations were further broken down and categorized as either itinerant or local. To project the percent split in activity, future operations were projected to retain the average historical split: approximately 68.0 percent itinerant and 32.0 percent local as shown in **Table 3-26**.

Table 3-26 – Recommended GA Operations Forecast (Itinerant Vs. Local)

Year	Itinerant	Local	Total
2021	34,665	16,343	51,008
2026	36,193	17,063	53,256
2031	37,701	17,774	55,475
2036	39,209	18,485	57,694
2041	40,932	19,298	60,230
AAGR 2021-2041	0.8%	0.8%	0.8%
Growth Rate 2021-2041	18.1%	18.1%	18.1%

Note: Average Annual Growth Rate (AAGR).

Source: FAA OPSNET, GARAA, CHA, 2022.

3.9 MILITARY ACTIVITY FORECAST

Military operations have fluctuated over the last decade; however, unlike other types of operations, historical trends in military activity levels are not representative of future activity. Rather, military operations are a function of military decisions, national security priorities, and budget pressures; therefore, military operations are not projected in the same manner as other types of operations occurring at the Airport.

During the baseline year (2021), AVL had 4,402 military operations (3,477 itinerant and 925 local). For the purposes of this forecast, projected military operations are assumed to remain static at the baseline year levels throughout the forecast horizon.

Similar to military operations, the standard methodologies used for determining general aviation-based aircraft cannot be applied when determining military based aircraft, thus military based aircraft are assumed to remain static.

Currently, the military does not have any based aircraft stationed at AVL; therefore, it was assumed that AVL will not have military owned based aircraft during the forecast period.

3.10 RECOMMENDED FORECAST SUMMARY

The following tables present a summary of the recommended aviation activity forecasts for air carrier (enplanements and operations), GA, and military activity levels as detailed in the previous sections. The recommended forecasts will be used as the basis for future planning for the Airport.

Table 3-27 presents the complete summary of the recommended forecast.

Table 3-27 – Recommended Forecast Summary

Year	Based Aircraft	Enplanements	Operations					Total
			Commercial	General Aviation		Military		
				Itinerant	Local	Itinerant	Local	
2021	161	716,015	20,328	34,665	16,343	3,477	925	75,738
2026	168	1,038,576	26,054	36,193	17,063	3,477	925	83,712
2031	175	1,162,182	28,292	37,701	17,774	3,477	925	88,169
2036	182	1,300,499	30,723	39,209	18,485	3,477	925	92,819
2041	190	1,455,279	33,363	40,932	19,298	3,477	925	97,995
AAGR 2021-2041	0.8%	3.6%	2.5%	0.8%	0.8%	0.0%	0.0%	1.3%
Growth Rate 2021-2041	18.0%	103.2%	64.1%	18.1%	18.1%	0.0%	0.0%	29.4%

Note: Average Annual Growth Rate (AAGR).

Source: FAA 2021 TAF, FAA OPSNET, Bureau of Transportation Statistics, Woods & Poole Economics, Airport Master Record (Form 5010), GARAA, CHA, 2022.

Per FAA requirements, in order for Master Plan forecasts to be approved the forecast should be within 10 percent of the TAF in the first 5 years and 15 percent in 10 years—as set forth by the FAA in AC 150/5070-6B, *Airport Master Plans*. **Table 3-28** details the recommended forecast of enplanements and total airport operations (all activity types) in comparison to the FAA TAF forecast.

In 5-years (2026), enplanements are projected to be 11.9 percent above the FAA 2021 TAF projections. Although enplanements are projected to be 1.9 percent above the acceptable range of 10 percent, the recommended forecast is justifiable. As portrayed in **Table 3-28**, activity at the Airport is recovering quicker than the FAA initially anticipated. The FAA projected that enplanements would not surpass 2019 activity levels until 2023; however, at the current rate of recovery and with new service confirmed to be provided by Jet Blue, enplanements are

anticipated to fully recover by the end of 2022. This growth is further supported by the FAA 2022 Draft TAF, which projects enplanements now recovering in 2022 rather than in 2023. When comparing the Master Plan’s projected enplanements to the FAA 2022 Draft TAF, enplanements are projected to be within the FAA’s acceptable range with a difference of approximately 5.7 percent in 5 years.

In 10 years (2031), enplanements are projected at approximately 12.6 percent above the FAA 2021 TAF and 7.8 percent above the FAA 2022 Draft TAF, which are within the FAA’s criteria.

Commercial operations are projected to be within FAA parameters in 5 and 10 years when comparing the Master Plan forecast to the FAA 2021 TAF and to the FAA 2022 Draft TAF.

Table 3-28 – FAA Appendix C: Comparing Airport Planning and TAF Forecasts

Specified Base Year: 2021	Year	Master Plan Forecast (MPF)	FAA 2021 TAF	MPF/FAA 2021 TAF (% Difference)	FAA 2022 Draft TAF	MPF/FAA 2022 Draft TAF (% Difference)
Passenger Enplanements						
Base yr.	2021*	716,015	591,035	21.1%	611,321	17.1%
Base yr. + 5yrs.	2026	1,038,576	928,427	11.9%	982,575	5.7%
Base yr. + 10yrs.	2031	1,162,182	1,032,306	12.6%	1,078,336	7.8%
Base yr. + 15yrs.	2036	1,300,499	1,131,805	14.9%	1,174,055	10.8%
Commercial Operations						
Base yr.	2021*	20,328	25,071	-18.9%	25,071	-18.9%
Base yr. + 5yrs.	2026	26,054	30,308	-14.0%	29,346	-11.2%
Base yr. + 10yrs.	2031	28,292	32,079	-11.8%	31,746	-10.9%
Base yr. + 15yrs.	2036	30,723	33,896	-9.4%	34,160	-10.1%
Total Operations						
Base yr.	2021*	75,738	73,121	3.6%	73,121	3.6%
Base yr. + 5yrs.	2026	83,712	81,258	3.0%	84,335	-0.7%
Base yr. + 10yrs.	2031	88,169	83,201	6.0%	86,916	1.4%
Base yr. + 15yrs.	2036	92,819	85,191	9.0%	89,512	3.7%

* Master Plan Forecast data depicts calendar years, while the FAA TAFs depict fiscal year data.

Source: FAA 2021 TAF, FAA 2022 Draft TAF, FAA OPSNET, Bureau of Transportation Statistics, Woods & Poole Economics, Airport Master Record (Form 5010), GARAA, CHA, 2022.

The full recommended enplanements, alternate enplanements, and operations forecasts can be found in **Appendix A**. In accordance with FAA requirements, a summary of forecasted levels and growth rates, as well as operational factors, is included in **Appendix B**.

Pilot Shortage and Changes in Activity

After developing the proposed enplanements forecast, several airlines announced changes in service due to a nation-wide pilot shortage, with changes scheduled to occur in June. In response to a shortage of pilots, American, Delta, and Allegiant have announced changes in frequencies, as shown in **Table 3-29**. When comparing the previously published and current June schedules, AVL is expected to lose 25 departures per week, for a loss of 3,241 seats per week.

Although activity in June is expected to be less than previously anticipated, activity is scheduled to be slightly higher than in May, with an additional 23 flights and 2,143 available seats per week. As of May 12, 2022, the published schedules for July at AVL depict an overall increase in activity from June. Allegiant, Delta, and Jet Blue have each scheduled additional flights, while Sun Country and United expect to retain May and June activity levels. In July, American is currently scheduled to decrease activity by two operations per week.

Table 3-29 – June Scheduling Changes

Destination	Departures Per Week			Destination	Departure Seats Per Week		
	Previous	Current	Departures Lost		Previous	Current	Seats Lost
Allegiant				Allegiant			
AUS	2	2	0	AUS	354	342	12
BOS	4	4	0	BOS	708	744	-36
BWI	3	2	1	BWI	531	372	159
DEN	4	4	0	DEN	687	714	-27
EWR	4	3	1	EWR	645	468	177
EYW	2	2	0	EYW	312	312	0
FLL	12	9	3	FLL	1,998	1,494	504
HOU	2	2	0	HOU	312	342	-30
LAS	2	2	0	LAS	312	372	-60
MDW	2	2	0	MDW	312	312	0
MSP	2	2	0	MSP	354	372	-18
PBI	3	2	1	PBI	510	372	138
PGD	7	6	1	PGD	1,134	996	138
PIE	12	8	4	PIE	2,019	1,368	651
SFB	12	8	4	SFB	2,019	1,338	681
SRQ	2	2	0	SRQ	354	372	-18
VPS	1	1	0	VPS	156	156	0
Total	76	61	15	Total	12,717	10,446	2,271
American				American			
AUS	1	1	0	AUS	76	76	0
BOS	1	1	0	BOS	76	76	0
CLT	56	54	2	CLT	4,179	4,049	130
DCA	9	9	0	DCA	684	684	0
DFW	15	15	0	DFW	1,140	1,140	0
LGA	1	1	0	LGA	76	76	0
MIA	7	7	0	MIA	532	532	0
ORD	7	7	0	ORD	532	532	0
PHL	7	7	0	PHL	455	455	0
Total	104	102	2	Total	7,750	7,620	130
Delta				Delta			
ATL	42	35	7	ATL	4,620	3,850	770
LGA	14	13	1	LGA	985	915	70
MSP	1	1	0	MSP	132	132	0
Total	57	49	8	Total	5,737	4,897	840
All Carriers	277	252	25	All Carriers	28,626	25,385	3,241

Source: GARAA, CHA, 2022.

Although activity in June is expected to be less than previously anticipated, activity is scheduled to be slightly higher than in May, with an additional 23 flights and 2,143 available seats per week. As of May 12, 2022, the published schedules for July at AVL depict an overall increase in activity from June as shown in **Table 3-30**. Allegiant, Delta, and Jet Blue have each scheduled additional flights, while Sun Country and United expect to retain May and June activity levels. In July, American is currently scheduled to decrease activity by two operations per week.

Table 3-30 – Weekly Schedules (May, June, & July)

	May	June	July		May	June	July
	Allegiant				Allegiant		
	58	61	77		9,993	10,446	12,894
American			American				
	85	102	100		6,229	7,620	7,454
Delta			Delta				
	49	49	57		4,898	4,897	5,731
Jet Blue			Jet Blue				
	0	3	5		0	300	500
Sun Country			Sun Country				
	2	2	2		372	372	372
United			United				
	35	35	35		1,750	1,750	2,078
Total	229	252	276	Total	23,242	25,385	29,029

Source: GARAA, CHA, 2022.

Despite the changes in activity levels, the changes that are anticipated are not expected to heavily impact the recommended forecast.

3.11 PEAK ACTIVITY LEVELS

Airports experience peaks in total operations and enplanements that drive demand for various areas of airport infrastructure. To properly plan, size, and design passenger terminal facilities, an understanding of peak month-average day (PMAD) and peak hour is necessary. The peak month, PMAD, and peak month-peak hour forecasts are key elements in defining the future facility requirements needed to accommodate above average levels of utilization (or peak activity).

The peak month is the calendar month of the year when the highest level of enplanements and operations typically occur. Peak month-average day is simply the total operations or passengers divided by the number of days in the peak month. To provide the necessary metrics for the demand/capacity analysis, PMAD was projected for the following:

- ✈ Commercial Operations
- ✈ Total Airport Operations (All Users)
- ✈ Enplanements and Total Passengers

To determine peak hour during the PMAD, FAA Traffic Flow Management System Counts (TFMSC) hourly data and airline schedules were examined. For the purposes of this Study, the 15 minutes

prior and 15 minutes following the peak hour were included to represent the likely demand placed on the terminal facility. This additional 30 minutes is known as the surge factor, which accounts for passengers arriving at the Airport early for their flight and for schedule slippage and delays.

Each peak element must be presented separately:

- ✈ Peak commercial air carrier operations - define the demand for airside facilities (gates and ramp)
- ✈ Peak hour airport operations - determine runway capacity and airfield needs
- ✈ Peak enplanements and total passengers - direct impact on terminal (e.g., ticketing and baggage claim) and landside (e.g., access roads and parking) facilities

Terminal facilities are generally designed to accommodate enplanements on the average day during the peak month, rather than the absolute peak level of activity. A review of historical enplanements and operations at AVL was performed to identify the peak month for commercial activity.

3.11.1 Peak Commercial Operations

In 2021, peak commercial operations at AVL occurred in July. To estimate the PMAD, peak month commercial operations (2,361) was divided by the number of days in the peak month of July (31). The percent share of peak month and PMAD commercial operations was assumed to remain static throughout the forecast horizon, or at 11.6 percent and 3.2 percent, respectively.

To determine the average number of commercial operations occurring during the peak hour, TFMSC hourly data and scheduling data were examined. In July 2021, AVL experienced approximately 11 commercial operations during the Airport’s peak hour (11:45 am -1:15 pm). In 2022, the peak hour in July is projected to be between 12:30 pm and 2:00 pm with approximately 17 commercial operations, or 18.5 percent of PMAD activity. For the purposes of this forecast, it was assumed that future peak hour commercial operations will consist of approximately 18.5 percent of the PMAD activity.

The peak commercial operations forecast is presented in **Table 3-31**.

Table 3-31 – Peak Commercial Operations

Year	Annual Commercial Operations	Peak Month Percent	Peak Month Operations	Percent of Peak Month	PMAD	Percent of Peak Hour	Peak Hour
2021	20,328	11.6%	2,361	3.2%	76	14.4%	11
2026	26,054	11.6%	3,026	3.3%	100	18.5%	19
2031	28,292	11.6%	3,286	3.3%	109	18.5%	20
2036	30,723	11.6%	3,568	3.3%	118	18.5%	22
2041	33,363	11.6%	3,875	3.3%	128	18.5%	24

Source: FAA OPSNET, Bureau of Transportation Statistics (T-100 Data), GARAA, CHA, 2022.

3.11.2 Peak Airport Operations (All Users)

Although peak commercial operations in 2021 occurred in July, peak total operations (combined air carrier, general aviation, and military) occurred in August. To estimate the PMAD, peak month operations (7,737) was divided by the number of days in the peak month of August (31).

In August 2021, AVL experienced 28 airport operations during the Airport’s peak hour for total operations, which occurred at approximately 11:00 AM. The peak operation forecast is illustrated below in **Table 3-32**.

Table 3-32 – Peak Operations (All Users)

Year	Annual Airport Operations	Peak Month Percent	Peak Month Airport Operations	Percent of peak Month	Peak Month Average Day	Peak Hour Percent	Peak Hour
2021	75,738	10.2%	7,737	3.2%	250	11.2%	28
2026	83,712	10.2%	8,552	3.2%	276	11.2%	31
2031	88,169	10.2%	9,007	3.2%	291	11.2%	33
2036	92,819	10.2%	9,482	3.2%	306	11.2%	34
2041	97,995	10.2%	10,011	3.2%	323	11.2%	36

Source: FAA OPSNET, Bureau of Transportation Statistics (T-100 Data), GARAA, CHA, 2022.

3.11.3 Peak Enplanements and Total Passengers

When developing the forecast, the peak month for total passengers and enplanements (July) was determined by examining monthly passengers and enplanements statistics provided by the Airport. To determine the PMAD, peak month activity levels were divided by the number of days in the peak month of July (31).

Peak hour passenger and enplanement levels in 2021 and 2022 were determined based on scheduling data and load factors. In 2021, the peak hour for passengers was around 11:45 am to 1:15 pm with approximately 849 passengers. Peak hour enplanements (approximately 616 enplanements) occurred between approximately 6:00 am and 7:30 am. Scheduling data for July 2022 indicated projections of approximately 1,354 peak hour passengers between 12:30 pm and 2:00 pm (or 19.6 percent of PMAD passengers), as well as approximately 732 enplanements from 11:30 am to 1:00 pm (or 21.3 percent of PMAD enplanements). For the purposes of this Study, the percent of the PMAD passenger and enplanement activity levels occurring within the peak hour were assumed to remain static throughout the forecast horizon. The peak passengers forecast is illustrated below in **Table 3-33**, while the peak enplanements forecast is shown in **Table 3-34**.

Table 3-33 – Peak Passengers

Year	Passengers	Peak Month Percent	Peak Month Passengers	Percent of Peak month	Peak Month Average Day	Percent of Peak Hour	Peak Hour
2021	1,428,266	12.8%	182,470	3.2%	5,886	14.4%	849
2026	2,077,152	12.8%	265,369	3.2%	8,571	19.6%	1,684
2031	2,324,364	12.8%	296,952	3.2%	9,591	19.6%	1,885
2036	2,600,999	12.8%	332,294	3.2%	10,733	19.6%	2,109
2041	2,910,557	12.8%	371,842	3.2%	12,010	19.6%	2,360

Source: GARAA, CHA, 2022.

Table 3-34 – Peak Enplanements

Year	Enplanements	Peak Month Percent	Peak Month Enplanements	PMAD Percent	PMAD	Peak Hour Percent	Peak Hour
2021	716,015	12.8%	91,609	3.2%	2,955	20.8%	616
2026	1,038,576	12.8%	132,878	3.2%	4,277	21.3%	910
2031	1,162,182	12.8%	148,693	3.2%	4,787	21.3%	1,019
2036	1,300,499	12.8%	166,390	3.2%	5,356	21.3%	1,140
2041	1,455,279	12.8%	186,192	3.2%	5,994	21.3%	1,276

Source: GARAA, CHA, 2022.

3.12 POTENTIAL FOR CARGO ACTIVITY

AVL does not currently have cargo activity; however, it was important to evaluate the potential the impact services would have on the Airport should they occur. The cargo activity discussed herein will be used for assessing facility requirements.

For planning purposes, cargo activity was assumed to begin operating two times per week in the short-term (or approximately 5 years) via an ATR-42 or Cessna 208 Caravan, which would result in 208 operations annually.

Operations were assumed to transition to three times per week in the mid-term (approximately 10 years) to long-term (between approximately 15 and 20 years), for a total of 312 operations annually.

3.13 CRITICAL AIRCRAFT AND AIRPORT REFERENCE CODE

The foundation of facility planning and design of federally obligated airports are based on the specifications and dimensional requirements of the critical aircraft, making the critical aircraft an important component of the airport planning process. Per FAA AC 150/5000-17, *Critical Aircraft and Regular Use Determination*, the critical aircraft is the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use⁹ of the airport.

The FAA classifies airports and runways by Airport Reference Codes (ARC) based on their existing and planned operational capabilities. ARC is an airport designation that represents the Aircraft Approach Category (AAC) category and Airplane Design Group (ADG) group of the aircraft that the airfield is intended to accommodate on a regular basis (at least 500 annual operations). The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on the airport.

3.13.1 Critical Aircraft and Airport Reference Code

To determine the current critical aircraft for AVL, FAA Traffic Flow Management System (TFMSC) and Bureau of Transportation statistics operational data were evaluated to identify trends by AAC category and ADG grouping. **Table 3-35** presents the operations by groupings. As shown,

⁹ Regular use is defined as an aircraft or grouping of aircraft with more than 500 annual operations, including both itinerant and local operations, but excluding touch-and-go operations.

AVL experienced more than 500 annual operations for AAC Category D and ADG Group III aircraft in 2021; therefore, based on the analysis of TFMSC operations data, D-III represents the current ARC and current group of aircraft with similar characteristics, or the current critical aircraft grouping. An example of a D-III aircraft operating at AVL is the B737-800.

Table 3-35 – AVL Operations by AAC Category and ADG Group (FY 2021)

AAC & ADG		2021
Subtotal by AAC	A	6,769
	B	12,227
	C	23,511
	D	648
Subtotal by ADG	I	11,242
	II	17,451
	III	14,408
	IV	54

*The totals shown within this table only include those reported in the TFMSC, or those with filed flight plans.
Source: FAA TFMSC, CHA, 2022.

Future Airport Reference Code

When projecting future aircraft groupings, it was assumed that operations would retain the percent makeup by user class (i.e., commercial, general aviation, and military) from 2021. As shown in **Table 3-36**, the future ARC at AVL is predicted to remain at D-III, with the B737-800 representing an aircraft within the future critical aircraft family.

Table 3-36 – AVL Operations by AAC Category and ADG Group (Projected) – All

AAC & ADG		2026	2031	2036	2041
Subtotal by AAC	A	21,616	22,511	23,407	24,430
	B	27,824	28,868	29,912	31,105
	C	32,262	34,676	37,272	40,101
	D	2,009	2,114	2,229	2,359
Subtotal by ADG	I	37,573	39,070	40,567	42,278
	II	21,953	22,950	23,972	25,122
	III	23,990	25,954	28,085	30,400
	IV	195	195	195	195

Source: FAA TFMSC, Bureau of Transportation Statistics (T-100 Data), GARAA, CHA, 2022.

APPENDIX A – RECOMMENDED FORECAST

Table A1 – Recommended Forecast (2021-2041)

Year	Based Aircraft	Enplanements	Operations					Total
			Commercial	General Aviation		Military		
				Itinerant	Local	Itinerant	Local	
2021	161	716,015	20,328	34,665	16,343	3,477	925	75,738
2022	162	834,995	23,896	34,900	16,454	3,477	925	79,652
2023	164	930,882	25,861	35,331	16,657	3,477	925	82,251
2024	165	992,896	26,683	35,547	16,758	3,477	925	83,390
2025	167	1,015,479	26,376	35,977	16,962	3,477	925	83,717
2026	168	1,038,576	26,054	36,193	17,063	3,477	925	83,712
2027	169	1,062,198	26,487	36,408	17,165	3,477	925	84,462
2028	171	1,086,357	26,927	36,839	17,368	3,477	925	85,536
2029	172	1,111,066	27,374	37,055	17,469	3,477	925	86,300
2030	173	1,136,337	27,830	37,270	17,571	3,477	925	87,073
2031	175	1,162,182	28,292	37,701	17,774	3,477	925	88,169
2032	176	1,188,616	28,762	37,916	17,876	3,477	925	88,956
2033	178	1,215,650	29,241	38,347	18,079	3,477	925	90,069
2034	179	1,243,300	29,727	38,563	18,180	3,477	925	90,872
2035	181	1,271,578	30,221	38,994	18,383	3,477	925	92,000
2036	182	1,300,499	30,723	39,209	18,485	3,477	925	92,819
2037	184	1,330,079	31,234	39,640	18,688	3,477	925	93,964
2038	185	1,360,331	31,753	39,855	18,790	3,477	925	94,800
2039	187	1,391,271	32,281	40,286	18,993	3,477	925	95,962
2040	188	1,422,915	32,817	40,502	19,094	3,477	925	96,815
2041	190	1,455,279	33,363	40,932	19,298	3,477	925	97,995
AAGR 2021-2041	0.8%	3.6%	2.5%	0.8%	0.8%	0.0%	0.0%	1.3%
Growth Rate 2021-2041	18.0%	103.2%	64.1%	18.1%	18.1%	0.0%	0.0%	29.4%

Note: Average Annual Growth Rate (AAGR).

Source: FAA 2021 TAF, FAA OPSNET, Bureau of Transportation Statistics, Woods & Poole Economics, Airport Master Record (Form 5010), GARAA, CHA, 2022.

APPENDIX B – FAA APPENDIX B

Table B1 – FAA Appendix B: Airport Planning Forecasts

A. Forecast Levels and Growth Rates (Sample Data Shown)									
Specified Base Year: 2021	Base Yr. Level	Base Yr. +1yr.	Base Yr. +5yrs.	Base Yr. +10yrs.	Base Yr. +15yrs.	Average Annual Compound Growth Rates			
						Base Yr. to +1	Base Yr. to +5	Base Yr. to +10	Base Yr. to +15
Passenger Enplanements									
Air Carrier	716,015	834,995	1,038,576	1,162,182	1,300,499	16.6%	7.7%	5.0%	4.1%
Operations									
<u>Itinerant</u>									
Air carrier	20,328	23,896	26,054	28,292	30,723	17.6%	5.1%	3.4%	2.8%
General aviation	34,665	34,900	36,193	37,701	39,209	0.7%	0.9%	0.8%	0.8%
Military	3,477	3,477	3,477	3,477	3,477	0.0%	0.0%	0.0%	0.0%
<u>Local</u>									
General aviation	16,343	16,454	17,063	17,774	18,485	0.7%	0.9%	0.8%	0.8%
Military	925	925	925	925	925	0.0%	0.0%	0.0%	0.0%
TOTAL OPERATIONS	75,738	79,652	83,712	88,169	92,819	5.2%	2.0%	1.5%	1.4%
Peak Hour Operations	28	30	31	33	35	5.81%	2.3%	1.7%	1.4%
Cargo/mail (enplaned + deplaned tons)	0	0	0	0	0	-	-	-	-
Based Aircraft									
Single-Engine	144	145	147	150	154	0.69%	0.4%	0.4%	0.4%
Multi-Engine	9	9	9	10	10	0.86%	0.0%	1.1%	0.7%
Jet	5	5	9	12	15	0.00%	12.5%	9.1%	7.6%
Helicopter	3	3	3	3	3	-	-	-	-
TOTAL	161	162	168	175	182	0.7%	0.9%	0.8%	0.8%

B. Operational Factors					
	Base Yr. Level	Base Yr. +1yr.	Base Yr. +5yrs.	Base Yr. +10yrs.	Base Yr. +15yrs.
Average aircraft size (seats per departure)	97	98	109	109	109
Average enplaning load factor	72.6%	71.6%	73.3%	75.6%	77.9%
GA operations per based aircraft	317	317	317	317	317

Source: FAA 2021 TAF, FAA OPSNET, Bureau of Transportation Statistics, Woods & Poole Economics, Airport Master Record (Form 5010), GARAA, CHA, 2022.